

Presence of *Technitella legumen* Norman, 1878 (Foraminifera, Saccaminidae) in *Posidonia oceanica* meadows sediments of Mallorca (Balearic Islands, Western Mediterranean)

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Technitella legumen Norman, 1878 is an agglutinated foraminifera that shows a world wide distribution. During the study of microfaunistic biodiversity in *Posidonia oceanica* it has been found in this sea-grass meadows of Calvià (Mallorca) in samples taken at 4 meters depth. It is a typical cold deep waters foraminifera. It has been also reported in several places over the Western Mediterranean between 75-500 meters depth. In this paper the first record of *Technitella legumen* in modern sediments in the Balearic Sea is reported.

Keywords: agglutinated foraminifera, *Technitella legumen*.

PRESENCIA DE *Technitella legumen* NORMAN, 1878 (FORAMINIFERA, SACCAMINIDAE) ALS SEDIMENTS DE LA PRADERIA DE *Posidonia oceanica* DE MALLORCA (ILLES BALEARS, MEDITERRÀNIA OCCIDENTAL). Durant l'estudi de la biodiversitat microfaunística de la pradera de *Posidonia oceanica* del litoral de Calvià (Mallorca), s'han trobat a les mostres de rizoma extretes a 4 m de profunditat, diversos exemplars del foraminífer *Technitella legumen* Norman, 1878. Aquest foraminífer, de distribució mundial i típic d'aigües pregones i fredes, ha estat trobat en diverses localitats de la Mediterrània occidental, sempre a profunditats compreses entre els 75 i 500 m. Es presenta la primera cita de *Technitella legumen* per a les aigües de les Illes Balears.

Paraules clau: foraminífers aglutinats, *Technitella legumen*.

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Introduction

Foraminifera are marine protozoa containing a test which is normally calcareous but occasionally silicious. Four main groups are distinguishable depending on their formation: porcelainous, hyaline, perforated and agglutinated.

Agglutinated foraminifera are considered the most primitive; records have been found dating back to the Cambrian period. The test is formed by the uniting of various exogenous particles in an organic cement produced by the foraminifera. Chamber arrangement is variable. Uni, bi and tri-serial dispositions are found.

Technitella legumen Norman, 1878 is a monochamber agglutinated foraminifera.

Material

Six *Technitella legumen* individuals, from Santa Ponça and Cala Fornells sea-grasses, have been studied. The foraminifera extracted from the rhizome samples are displayed in the University of Balearic Islands (UIB) Micropaleontology lab collection.

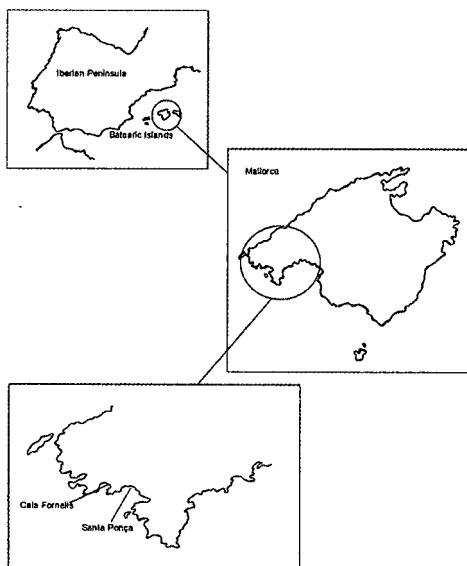


Fig. 1. Location of the sampling stations.

Fig. 1. Localitats on s'ha efectuat el mostratge.

Methods

Samples from two locations in the Calvià littoral (Santa Ponça and Cala Fornells) have been studied (Fig. 1). Two scuba divers picked ten *Posidonia oceanica* bunches each two months in one year from both locations. Leaves were detached from rhizomes and submerged in distilled water to obtain all of the epiphytic foraminifera present. Samples were then sifted (125, 250 and 500 microns) and stained with Rose Bengal. The foraminifera were subsequently picked and classified using a stereomicroscope.

Description

Family Saccaminidae Brady, 1884

Subfamily Saccamininae Brady, 1884

Genus *Technitella* Norman, 1878

Type species: *Technitella legumen* Norman, 1878; SD Cushman, 1910, p.47.

Technitella Norman, 1878, p.279, 281.

Hyperaminella de Folin, 1881, p.140 (nom. nud.); de Folin, 1887, p.114 (nom. nud.; non *Hyperaminella* Cushman and Waters, 1928).

Artechnitum Rhumbler, 1913, p.350 (err. emend.)

Description: Test (a single chamber) free, elongate, oval, fusiform or cylindric, up to 3 mm in length (the species reported in this paper is larger); thin wall of agglutinated longitudinally aligned sponge spicules and some quartz grains embedded in a hyaline organic matter; aperture terminal rounded, may be slightly produced on a neck or have a thickened border.

Genotype: *Technitella legumen* Norman.

Technitella legumen Norman, 1878, Ann. Mag. Nat. Hist., ser.5, vol.I, p.279, pl.16, fig. 3, 4; Brady, 1884, p.246, pl.25, fig.8-10; Goës, 1894, p.14, pl.3, fig.20-27; Cushman, 1918, p.59, pl.9, fig.1, 2; pl.10, fig. I; pl. 16, fig. 8; pl. 24, fig. 3-5 (?); pl. 26, fig. 5.

Description: Test elongate, ovoid to cucumber form; test opalescent white, outside consis-



Fig. 2. *Technitella legumen* Norman, 1878.

ting of fine longitudinally placed sponge needles; one end closed; rounded, ending in a pointed group of needles; rounded aperture which may contain several lips and elongated dents also formed of sponge needles. On section the sponge spicules are arranged obliquely, tile-wise, with spicules points directed backwards, inner layer consists of fine spicules arranged transversely (Cimerman & Langer, 1991) (Figs. 2, 3 and 4).

Ecology and distribution

This species appeared during the Oligocene and currently resides in modern seas exhibiting wide distribution (Loeblich & Tappan, 1988). The species has been reported in the North and South Atlantic, Pacific, Antarctic, Europe, South America and Australia.

Hofker (1972) suggests that the genus *Technitella* appeared as a consequence of the evolution of the genus *Hippocrepinella*. The incorporation of sponge spicules might be a further step in the level of development of agglutination. This characteristic is the main difference between both genera.

Technitella legumen exhibits a more variable life cycle when compared to other Foraminifera. In addition to multiple fission, several other forms of asexual reproduction including budding have been described (Goldstein, S. T. in Sen Gupta, B.K., 2002).

Hofker (1972) reports the species presence at



Fig. 3. Microphotography (SEM) of *Technitella legumen*. Detail of the apertural tongues.

Fig. 3. Microfotografia (SEM) de *Technitella legumen*. Detall de l'obertura.

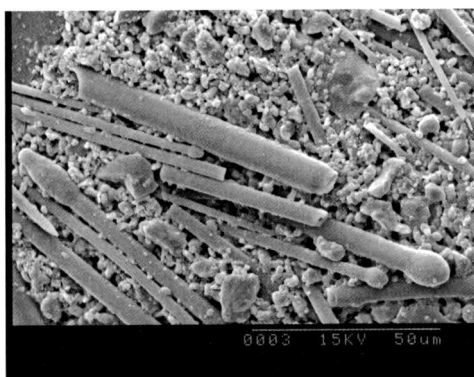


Fig. 4. Microphotography (SEM) of *Technitella legumen*. Detail of the wall test.

Fig. 4. Microfotografia (SEM) de *Technitella legumen*. Detall de la paret de la closca.

100 m depth, in Kattegat (st. 69, Petersen), in the North Atlantic, the exact location where Höglund figured and described the species in 1947.

Other species such as *T. erinaceus*, *T. melo* have been found in samples of Frederiksted, W of St. Croix (Caribbean Sea).

Primitive agglutinated Foraminifera are often found in shallow waters and relatively cold environments. Nevertheless, these species are found at greater depths in tropical and subtropical seas. Temperature then, may play a more important role in their distribution than depth.

Colom (1964) described the occurrence of

several primitive agglutinated species at depths of 350-520 m in the Balearic sea. *Technitella legumen* nor any other species of the same genus were mentioned. The individuals found in these assemblages were smaller than individuals found in the North Atlantic and in the Caribbean Sea and some species occurred more frequently (Hofker, 1972).

Although the species presence has been reported in Burdigalian outcrops in Mallorca Colom (1946), this is the first finding of the species in very shallow waters (4-10 m) and modern sediments from the Balearic Sea *Posidonia oceanica* sea grasses.

Lacroix also found this species in relatively shallow water in the Mediterranean. He reported large test size, as in this paper.

Sgarrella and Moncharmont Zei (1993) found this foraminifera in the Gulf of Naples (Mediterranean Sea). It is a rare species, only described in 89-155m, 92-165m, 229-320m and 555m depth samples.

Technitella legumen is an uncommon species occurring in the Mediterranean being mostly reported from the Sea of Crete, between 100-200m (Blanc-Vernet, 1969).

Nevertheless, *Technitella legumen* and a few other unilocular agglutinated foraminifera are common species in relatively cold deep waters in disoxic environments (0,1-1.0 ml O₂/l). Alve (1994) found the genus *Technitella* in Frierjord (Norway) in the Oxygen Minimum Zone (OZM) in the superficial sediments down to 786 and 998m (Bernhard and Sen Gupta, 2002).

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References

- Bernhard, J.M. & Sen Gupta, B.K. 1999. Foraminifera of oxygen depleted environments. In: Sen Gupta, B.K. (eds.) *Modern Foraminifera*: 201-216. Kluwer Academic Publishers. Great Britain.
- Blanc-Vernet, L. 1996. *Contribution à l'étude des foraminifères de Méditerranée*. Thèse de Doctorat Etat. Travaux de la Station Marine d'Endoume, Marseille, 281 pp.
- Cimerman, F. & Langer, M.R. 1991. *Mediterranean Foraminifera*. Academia Scientiarum et Artium Slovenica. Liubljana. 118 pp.
- Colom, G. 1946. Los Foraminíferos vindobonienses de Mallorca. *Estudios Geológicos*, 3: 113-150.
- Colom, G. 1964. Estudios sobre la sedimentación costera Balear (Mallorca y Menorca). *Mem. Real Acad. Ci. Art. Barcelona*. 34 (15): 495-550.
- Goldstein, S.T. 1999. Foraminifera: A Biological Overview. In: Sen Gupta, B.K. (eds.) *Modern Foraminifera*: 37-56. Kluwer Academic Publishers. Great Britain.
- Hofker, J. 1972. *Primitive agglutinated Foraminifera*. Leiden, E.J. Brill. The Netherlands. 95 pp.
- Loeblich, Jr. & Tappan, H. 1988. *Foraminiferal Genera and their classification*. Vol 1 & 2. Van Nostrand Reinhold edit. New York. 969 pp.
- Sgarrella, F. & Moncharmont Zei, M. 1993. Benthic foraminifera of the Gulf of Naples (Italy): systematics and autoecology. *Boll. dell. Soc. Pal. It.*, 32 (2): 145-264.